Equipping the Objective Force

Brian J. Dunn

THE U.S. MILITARY, especially the Army, faces a dramatically different and uncertain strategic environment yet fields systems built for the last era. The Army's Cold War role was narrowly defined, requiring forward-deployed heavy armor to blunt massed armored assaults. Lightness meant death, and the Abrams main battle tanks (MBTs) and Bradley fighting vehicles used so successfully in the Gulf are the apogee of design built to win in that environment. The Army's familiar task of defending Western Europe and the Republic of Korea has given way to a global mission in which the Army must defeat a range of unspecified threats. The Army must deploy from the continental United States (CONUS), and the heavy systems built for the last era are ill-suited for this new role despite proven lethality and projected upgrades. Problems deploying units to Albania during Operation Allied Force in 1999 and the prospect of intervening in locations such as Rwanda have shown that for these types of missions, the heavy armor used in the Persian Gulf war so decisively is too heavy.

The ability to prevail in a Desert Storm-type campaign is still necessary, however, and reconciling these varied missions is the goal of the Objective Force. The new interim brigade combat teams (IBCTs) will test concepts of deploying as a light force yet prevailing as a heavy force on the road to the Army's Objective Force that will exploit the revolution in military affairs (RMA).[1] Major General R. Steven Whitcomb, U.S. Army Chief of Armor, plans to equip the Objective Force with a future combat system (FCS) possessing "substantially improved strategic mobility and tactical agility, while maintaining overwhelming firepower and crew protection."[2] It is not called a tank because the FCS is envisioned as a vehicle that will be part of a networkcentric force that blurs distinctions between combat branches and blends combat support with the combat branches.[3] The Army must field an FCS to be lighter, faster, and more agile than the Cold War Army yet still meet threats in 2025. We are clearly asking too much of this envisioned FCS.

The need for strategic mobility drives the weight issue and has prompted many suggestions on how to design a lethal, yet lightweight, combat system. Simply carrying fewer rounds because the cannon is accurate and using a smaller crew will make the FCS smaller. A smaller vehicle will have a smaller surface area to protect, will require less armor—with no sacrifice in thickness—and will be lighter with no revolutionary protection needed.

Weight reduction is mandatory, yet the FCS must have no less lethality and survivability than current systems.[4] Envisioned capabilities include flying, tremendous sprint speed, self-healing attributes, and blasting or disabling weapons.[5] A two-man crew is a goal.[6] Crew maintenance and logistics should be minimized to avoid overwhelming the small crew with nonfighting duties. Even combat endurance will be difficult for a small crew. Automatic self-defense is needed to protect a sleeping crew or one that is otherwise incapable of fighting.[7] An external gun turret (EGT) that reduces weight and an advanced cannon are two features sometimes promoted.[8]

The Objective Force will exploit hybrid power systems; fuel consumption reductions of 75 percent; enhanced soldier performance; signature control; and advanced defenses, including active protection, new materials, alternative propellants, chemical and biological protection, and logistic efficiencies.[9] Many of the technical objectives are not expected until 2013.[10] The FCS must be in production by around 2015.[11]

Although different authors project capabilities, some ordinary and some fantastic, the overall tenor

of the debate has a science fair quality.[12] If you could wish for a future combat vehicle, it would be nice to receive one that was beyond your wildest dreams. Reality is likely to be far less comforting in its ability to reconcile the Army's need for power and deployability. It must not count on fielding a system that "pushes the boundaries of technology well beyond what is achievable today."[13] It may be as reasonable just to skip the inconvenient task of building an FCS and just wish for victory. Since the Army cannot replicate "Hammer's Slammers," let's look at the essentials.[14] The basic requirements for a combat system are shooting, moving, surviving, sustaining, and communicating.[15]

A Stryker Mobile Gun System fires its 105mm cannon during field testing.

US Army

The Army must use fewer lift assets and less logistics support to operate in even poorly developed theaters. The FCS will aid this effort if it provides a common chassis for other vehicles. The Army must reduce the bulk and weight of fuel and firepower, minimize in-theater maintenance requirements, and remove support units from the theater. Such a solution, if even possible, may not be wise if it creates a force that is vulnerable to even a hiccup in the supply line.

Shooting

Some mistakenly believe self-guided, long-range missiles will make guns obsolete.[16] The basic weapon for the FCS does not need great range, however. Terrain and obstacles will make extended ranges pointless in only rare situations. Kuwait is the exception. This preference for long-range, direct-fire missiles is especially puzzling, given that conventional wisdom holds that the Army will not fight conventional battles on broken and rolling terrain let alone a desert. Indeed, many futurists view urban warfare as the Army's likely field of battle. Given the varied missions and variety of threats to be defeated, the FCS must be able to shoot at armored vehicles, dismounted infantry, and helicopters.[17] Flexibility for multiple missions alone requires the FCS to be cannon-armed. The cannon need not be revolutionary and should be housed in a turret. The EGT sacrifices valuable interior space, and an advanced cannon may never appear.[18] Existing 105-millimeter (mm) or 120mm cannons are fine.

The Armored Gun System (AGS), for example, mounts a 105mm weapon that can defeat MBTs.[19] The Army can always replace cannons with self-guided, top attack missiles or, even better, introduce top attack cannon rounds. Cannons that can fire cheap, high-explosive rounds will be useful against dismounted infantry and to smash buildings used as fortresses in urban areas.[20] Since 120mm and larger cannons are already standard for MBTs and even larger weapons are envisioned, it may seem absurd to retreat to a smaller cannon. Missiles seem a reasonable alternative for light vehicles that cannot accommodate such mammoth weapons. A different approach that may allow the 105mm to be the weapon of choice for a future FCS is to redefine how we kill armored vehicles. Soft kills based on rounds that blanket a tank with non-penetrating submunitions that disable the vehicle's sensors and communications may be an alternative to heavier, bulkier, and more powerful weapons that can smash through active defenses and traditional armor.[21]

For long-range or beyond-line-of-sight firing, missiles should be part of the force. The power of today's precision weapons is already breathtaking. In the future, separating missiles from the FCS makes the most sense for a networked force. Missile modules, each containing two or more missiles, could be dropped off in the wake of the advancing FCS unit or even scattered by aircraft along the axis of advance in the enemy's rear areas. The FCS crew could control firing. For targets beyond the FCS's area of concern, higher echelon commanders could

US Army

An Armored Gun System coming down the ramp of a C-130. This vehicle has level 1—the lowest level—protection.

Even if we could add armor to level M1A2 standards, that may not be enough in 2025. When smart missiles can target any aspect of a tank regardless of the relative position of the target and firing platform, active defenses that extend protection outward from the simple bulk of armor will be necessary.

plug into all FCS sensors and gain a complete view of the battlefield using unmanned aerial vehicles and air- or tube-delivered sensors.

A variant carrying three or four infantry soldiers is necessary.[22] The infantry version should have an autocannon and allow the troops to fight mounted. The squad is small for dismounted fighting, but the Bradley already put U.S. infantry on the road to smaller squads. Compensating for reduced numbers, Land Warrior project-derived systems will digitize even walking infantry. Individual soldiers will be lethal, in constant communication, and exploit real-time intelligence. Each soldier will have more survivability than current equipment allows.[23] Infantry soldiers may even look forward to personal electronic shields that disarm incoming rounds by disabling their proximity fuses.[24] Dismounts may fight with flying or crawling robots that will see and kill for the soldiers.[25] Small numbers compensated by greater lethality at longer ranges will, however, make such hyperinfantry less appropriate for peace operations where restraint and face-to-face policing are necessary. Situational awareness and long-range personal firepower will be largely useless when soldiers patrol streets that allow civilians to approach within arm's length. Low-tech knives can kill even hypersoldiers under such circumstances.

Moving

Army studies support the conclusion that the FCS should be tracked for tactical movement.[26] Unless the Army anticipates fighting only in theaters with dense road networks, off-road movement must be assumed. Although wheeled vehicles are superior on roads, a road-bound force will simplify enemy mine-laying problems and make movement more predictable. Research prompted by mine experience in Vietnam shows that the United States can design tracks that degrade rather than break, allowing tracked vehicles to escape ambush similar to wheeled vehicles with "run flat" tires.[27] Once in theater, the FCS will be light enough to be capable of vertical envelopment and could break open a static linear battlefield if the enemy sets itself to fight indepth.[28]

For strategic mobility, the FCS should be air landed on roads in all but the most high-threat environments.[29] The need for strategic mobility drives the weight issue and has prompted many suggestions on how to design a lethal, yet lightweight, com-

bat system. Simply carrying fewer rounds because the cannon is accurate and using a smaller crew will make the FCS smaller. A smaller vehicle will have a smaller surface area to protect, will require less armor—with no sacrifice in thickness—and will be lighter with no revolutionary protection needed. Similarly, a smaller engine will reduce volume and therefore the weight of the tank.[30]

In addition to the obvious need to lighten the FCS so it can be airlifted, it must be lighter and smaller to lessen engineering support.[31] The Army cannot afford the time or lift assets to deploy engineers to strengthen bridges, reinforce and widen roads, or widen tunnels so combat vehicles can move. The FCS must also be able to cross water barriers with little or no preparation.[32] As an FCS unit deploys, it should be able to fight with what it has and not rely on later arriving elements.[33] If 30 percent of the unit is deployed, it should be 30 percent as effective as the entire unit.

A dangerous assumption is to think victory is certain and the only challenge is getting to the theater fast enough. If MBTs maintain their dominance with suitable modifications, enemies will have a tremendous advantage over the revolutionary FCS. The Army will get many FCS to the theater, but they may well die in large numbers against evolved dinosaurs. Although the Army would like the upper weight limit to be 39 tons so a C-17 could carry two, increasing the weight beyond 40 tons has been considered.[34] This alone suggests that having MBTs that are strategically deployable without sacrificing survivability may be impossible.

Surviving

Surviving in battle is the major problem the FCS must overcome. MBTs will be obsolete only after an effective successor is produced.[35] Armor protection must be consistent with strategic mobility limitations yet still provide survivability.[36] The AGS weighs about 19 tons with level 1 armor, 22 tons with level 2, and almost 25 tons with level 3.[37] Level 3 armor protects against 30mm cannons.[38] The crew can add the armor, and at level 1, the AGS is airdroppable.[39] Although even level 3 is insufficient for the FCS as envisioned, this modular approach is probably appropriate if developed further. Even if we could add armor to level M1A2 standards, that may not be enough in 2025.

When smart missiles can target any aspect of a tank regardless of the relative position of the target and firing platform, active defenses that extend protection outward from the simple bulk of armor will be necessary.[40] Survivability may also rely on "detection avoidance, hit avoidance, and kill avoidance technologies."[41] But how will an FCS with lethal active defenses operate in cities with friendly dismounts close by? Assuming identification friend or foe solves that problem, what about civilians who will complicate things? Automated lethal defenses that do not distinguish between a rocket-propelled grenade-armed enemy and a fleeing mother cradling her child will routinely lead to tragedy. If the system is turned off in urban areas to carry out peace operations, the FCS becomes a very expensive target that becomes vulnerable to low-tech weapons.

A Stryker provides overwatch as dismounted infantry engage in MOUT training at Fort Lewis, Washington.

US Army

This preference for long-range, direct-fire missiles is especially puzzling, given that conventional wisdom holds that the Army will not fight conventional battles on broken and rolling terrain let alone a desert. Indeed, many futurists view urban warfare as the Army's likely field of battle.

It may be unwise to rely solely on a light FCS if the Army needs a survivable system. If it can find a way around deploying from CONUS, future heavy systems would not need to conform to the tradeoffs necessary for the FCS to get to the theater quickly, and they might exhibit the same dominance as today's MBTs. Pre-positioned future heavy systems, perhaps afloat, should not be overlooked. Where pre-positioning is impractical, sealift from CONUS must be faster. We may even need to explore deploying more forces overseas to get ground troops closer to potential trouble spots for the initial rapid response.

Sustaining

Rapid response will be improved if we only deploy combat units and if those units need less support. The Army must use fewer lift assets and less

logistics support to operate in even poorly developed theaters.[42] The FCS will aid this effort if it provides a common chassis for other vehicles.[43] The Army must reduce the bulk and weight of fuel and firepower, minimize in-theater maintenance requirements, and remove support units from the theater.[44] Such a solution, if even possible, may not be wise if it creates a force that is vulnerable to even a hiccup in the supply line. Think of how simple the enemy's task is if he knows that merely slowing the supply flow can bring great benefits. That is far easier than severing a supply link for weeks as is necessary when iron mountains can sustain forces without a supply line. Some in-theater support and iron hills, as opposed to iron mountains, may be necessary so units can defend themselves at least a short time if the supply link is severed.[45] Otherwise, we rely on an enemy who is too unimaginative, passive, or incapable for secure logistics. The Persian Gulf war taught many Americans that winning is easy, but the Army should not act on that assumption. Underestimating an opponent to that degree would be criminal.

[The Army] must not count on fielding a system that "pushes the boundaries of technology well beyond what is achievable today." It may be as reasonable just to skip the inconvenient task of building an FCS and just wish for victory. . . . Let's look at the essentials. The basic requirements for a combat system are shooting, moving, surviving, sustaining, and communicating.

We must be wary of claims that we have achieved a transparent battlefield and a perfectly responsive force. As Carl von Clausewitz describes, the fog of war is not likely to be dispersed to that level, and our simple movements will still be hampered as if moving through water. The resulting friction may well be fatal to units composed of light vehicles that are unable to detect, let alone absorb, a first blow.

Fortunately, we do not need to assume revolutionary technologies to get results. The Army, while looking at ways to cope with the rising cost of operating the Abrams engine, found that newer, not revolutionary, engines could provide a "four-fold increase in reliability and at least a 35% reduction in fuel consumption without sacrificing current performance."[46] Mundane projects such as these could provide sizable benefits and would not rely on technological breakthroughs. Winning quickly to reduce opportunities for an enemy to disrupt the links from the rear and to reduce logistics requirements overall is an obvious, if problematic, method to enhance sustainability.[47] The very lightness of the FCS could hinder winning quickly.

Communicating

Information dominance is critical to revolutionizing the other factors. Communicating on a digitized battlefield will provide real-time awareness of friendly status, enemy locations, and supply availability, speeding the Army's operational tempo to dominate the battlefield.[48] Communications will allow the FCS to direct distant firepower if it does not use its own cannon. An FCS will identify a target, and the appropriate missile module, helicopter, aircraft, or artillery asset will destroy the target. The source of the warhead will not matter. Use of self-guided missiles for long-range fire can be exploited in stages depending on the state of the art. The FCS will be introduced into a digitized Army when it goes into production in 2015.[49] Initially, the FCS could carry missiles as the Bradley does today. Perhaps digitization will allow the FCS-mounted missiles to be fired remotely by another spotter. Eventually, we may be able to improve flexibility and reduce FCS weight and maintenance needs if we separate the missiles from the spotter.

In an interim step, the missiles could be separated out into firebases with missile modules deployed in groups that leapfrog to support the FCS. When networkcentric warfare matures, the missile modules can be dispersed so no vulnerable missile farms tempt an enemy and could be used as was described in the shooting section of this article. Ensuring the FCS shoots first could also alleviate the armor problem. As with winning quickly, guaranteeing the first shot, especially on the offensive, is easier said than done. We must be wary of claims that we have achieved a transparent battlefield and a perfectly responsive force. As Carl von Clausewitz describes, the fog of war is not likely to be dispersed to that level, and our simple movements will still be hampered as if moving through water. The resulting friction may well be fatal to units composed of light vehicles that are unable to detect, let alone absorb, a first blow.

The collapse of the Soviet Union transformed our strategic environment overnight. More than a decade later, the Army still fields systems designed for that era. A new, lighter vehicle suitable for a wide range of missions is necessary. The FCS may solve the Army's strategic mobility problem, but it threatens to truncate the Army's dominance of the conflict if

it is not as good as it needs to be. Even at 39 tons, the FCS may be too light if evolved MBTs retain their place on the battlefield. In addition, small numbers of FCS-mounted hyperinfantry will not be able to exploit their killing power in peace operations.

A light, cannon-armed FCS with an antitank guided missile attached and plugged into a tactical network will handle many moderate conventional threats and will be useful in stability operations. Experience with IBCTs may well give the Army a better sense of what light armor can do and lead it to accept that it cannot succeed in all threat environments. The IBCT has a limited role as an early entry force and clearly recognizes that it is not the main fighting force. It will eventually be supplanted by heavier divisions if the enemy is heavy and will fight as a maneuver unit of a division.[50] The Objective Force is to blur that distinction so that the light forces are the main fighting force. The FCS is critical to making this happen.

Building the FCS, however, is a high-risk venture. The Army should not spend whatever it takes attempting to meld multiple revolutionary technologies into one vehicle for all missions. The FCS should be different from the Abrams and Bradley but must be designed with near-term technology that incorporates modular improvements if the Army is to turn "gee whiz" ideas into actual hardware. Separated missiles and a sensor grid; active defenses; EGTs; and exotic engines, fuels, and weapons can be retrofitted to defeat more capable enemies. Barring successfully fielding exotic technologies to make the FCS work, the Army must consider how it will defeat future heavy systems if fighting actual enemies and not merely suppressing disorder becomes its mission once again. The tentative assumptions of 2001 will change by 2025. When they do, the Army will rue its failure today to accept that the wonder tank will not be built. ***MR***

Compensating for reduced numbers, Land Warrior project-derived systems will digitize even walking infantry. Individual soldiers will be lethal, in constant communication, and exploit real-time intelligence. Each soldier will have more survivability than current equipment allows. Infantry soldiers may even look forward to personal electronic shields that disarm incoming rounds by disabling their proximity fuses.

NOTES

1. Colonel Michael Mehaffey, "Vanguard of the Objective Force," *Military Review* (September-October 2000), 7-8. The IBCT is optimized to face low- to midrange threats but is considered a full-spectrum force. As such, it will be challenged to demonstrate prowess against heavy forces as well.
2. Major General B.B. Bell, "CG's Abrams Tank Update—April 2000," U.S. Army Armor Center, Fort Knox, Kentucky, at <http://knox-www.army.mil/center/cgpg/intent.htm>.
3. Scott Gourley, "Future Combat Systems: A Revolutionary Approach to Combat Victory," *Army* (July 2000), 26.
4. Assistant Secretary of the Army for Acquisitions, Logistics, and Technology (SAALT) at <http://www.sarda.army.mil/sard-zt/ASTMP98/vol_i/sec4/sec4s.htm>.
5. Ralph Peters, "The Future of Armored Warfare," *Parameters* (Autumn 1997) at <http://carlisle-www.army.mil/usawc/Parameters/97autumn/peters.htm>.
6. SAALT.
7. Dr. Asher H. Sharoni and Lawrence D. Bacon, "The Future Scout and Cavalry System (FSCS)," *Armor* (January-February 1999), 15.
8. Don Loughlin, "Remaining Relevant," *Armed Forces Journal International* (October 1997) at <http://www.afji.com/mags/1997/Oct/Featureforce.html>.
9. SAALT, <http://www.sarda.army.mil/sard-zt/ASTMP98/vol_i/sec5/sec5b3_7.htm>.
10. Ibid.
11. Stanley C. Crist, "The M1A2 Abrams: The Last Main Battle Tank?" *Armor* (July-August 1997), 14.
12. Loughlin.
13. Dr. Asher H. Sharoni and Lawrence D. Bacon, "The Future Combat System (FCS): A Satellite-fueled, Solar-powered Tank?" *Armor* (January-February 1998), 42.
14. The futuristic mercenary armored brigade science fiction author David Drake envisioned.
15. SAALT, <http://www.sarda.army.mil/sard-zt/ASTMP98/vol_i/sec4/sec4s.htm>.
16. Crist, "The M1A2 Abrams: The Last Main Battle Tank?" *Armor*, July-August 1997, 14-15. The Abrams rate of fire of six rounds per minute is contrasted unfavorably with the ability of self-guided missiles fired rapidly to engage multiple targets. Crist, promoting a missile-armed tank, postulated a single Abrams fighting six enemy vehicles and assumed they would all be firing on the Abrams as it sequentially targeted each of its enemies.
17. Loughlin.
18. Ibid.
19. Scott R. Gourley, "Armored Gun System," *Army* (June 2000), 66.
20. Loughlin.
21. R. M. Ogarkiewicz, "Transforming the Tank," *Jane's International Defense Review* (October 1997), 31-33.
22. Loughlin.
23. *Battlefield Automation: Army's Restructured Land Warrior Program Needs More Oversight*, General Accounting Office (GAO)/National Security and International Affairs Division (NSIAD)-00-28 (Washington, DC: GAO, December 1999), 5-6.
24. Scott R. Gourley, "SHORTSTOP Electronic Protection System," *Army* (July 2000), 62.
25. Peters.
26. Paul Hornback, "The Wheel Versus Track Dilemma," *Armor* (March-April 1998), 33-34.
27. Ralph Zumbro, "Mine Resistant Tracks," *Armor* (March-April 1997), 16-20.
28. Brigadier General Huba Wass de Czege and Lieutenant Colonel Antulio J. Echevarria II, "Insights for a Power-Projection Army," *Military Review* (May-June 2000), 9-10.
29. Ibid., 7.
30. Ogarkiewicz, 33 and 40-41.
31. Bell.
32. Loughlin.
33. Captain William S. Riggs, "Global Cavalry," *Armor* (March-April 1998), 26.
34. Scott R. Gourley, "On Track to the Future: The US Army's Combat System Concept," *Jane's International Defense Review* (October 1997), 39.
35. Loughlin.
36. Ibid.
37. U.S. Army Field Manual 17-15, *Tank Platoon* (Washington, DC: U.S. Government Printing Office, 3 April 1996), chapter 1, at <http://www.adtdl.army.mil/cgi-bin/atdl.dll/fm/17-15/chp1.htm>.
38. Federation of American Scientists, "M8 Armored Gun System," *Military Analysis Network* at <http://www.fas.org/man/dod-101/sys/land/m8-ags.htm>.
39. Gourley, "Armored Gun System," 66.
40. Captain Tom J. Meyer, "Active Protective Systems: Impregnable Armor or Simply Enhanced Survivability?" *Armor* (May-June 1998), 7-8.
41. SAALT.
42. Ibid.
43. Riggs, 25.
44. Wass de Czege and Echevarria, 4-5.
45. Ibid., 6.
46. Bell.
47. Wass de Czege and Echevarria II, 4-5.
48. *Battlefield Automation: Army Needs to Update Fielding Plan for First Digitized Corps*, GAO/NSIAD-00-167 (Washington, DC: GAO, July 2000), 5.
49. Ibid., 3.
50. Mehaffey, 7.

Brian J. Dunn is a nonpartisan research analyst for the Michigan Legislative Bureau. He received a B.A. from the University of Michigan and an M.A. from Eastern Michigan University. He served as a member of the Michigan Army National Guard. He taught history at Henry Ford Community College. His article "The Path of the Future Army" appeared in the September-October 2000 Military Review.